



## Biological production of tetrahydrocyclopentadiene

**Description of Technology:** The invention relates to the field of molecular biology and microbiology. More specifically, a gene involved in carotenoid biosynthesis has been isolated from *Pantoea stewartii*, altered by error-prone PCR, and expressed in a recombinant host to produce 3,4,3',4'-tetrahydrocyclopentadiene (TDHL). The present invention also relates to a process for producing TDHL.

### Patent Listing:

1. **US Patent No. 7,087,403**, Issued August 8, 2006, "Biological production of tetrahydrocyclopentadiene"

<http://patft.uspto.gov/netacgi/nph-Parser?Sect2=PTO1&Sect2=HITOFF&p=1&u=%2Fnetacgi%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&d=PALL&RefSrch=yes&Query=PN%2F7087403>

**Market Potential:** Carotenoids represent one of the most widely distributed and structurally diverse classes of natural pigments, producing light yellow to orange to deep red color. Eye-catching examples of carotenogenic tissues include carrots, tomatoes, red peppers, and the petals of daffodils and marigolds. Carotenoids are synthesized by all photosynthetic organisms, as well as some bacteria and fungi. These pigments have important functions in photosynthesis, nutrition, and protection against photooxidative damage. For example, animals do not have the ability to synthesize carotenoids and must obtain these nutritionally important compounds through their dietary sources.

Although small amounts of tetrahydrocyclopentadiene have been prepared chemically and trace amounts have been formed in biological systems, no means for economical production of significant amounts of TDHL exists (Hengartner et al., *Helvetica Chimica Acta*, (75):1848-1865 (1992); Albrecht et al., *supra*; and Schmidt-Dannert et al., *supra*). The problem to be solved, therefore, is to provide materials and methods useful for producing industrially-suitable amounts of TDHL in a recombinant production host.

Applicants have solved the stated problem by mutating *crtI* from *Pantoea stewartii* and expressing the mutated *crtI* genes along with other carotenoid biosynthetic enzymes in a recombinant host to produce industrially-suitable amounts of TDHL.

### Benefits:

- Produces industrially-suitable amounts of TDHL

### Applications:

- Pharmaceutical industry, food supplements, cosmetics, and animal feed additives.

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